Capturing crisis

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Solar Power and Humanitarian Energy Markets in Africa

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Abstract
Goudebou refugee camp in northern Burkina Faso has emerged as a testing ground for international efforts to find market-based solutions to the delivery of basic energy services in humanitarian contexts. This article follows energy researchers, humanitarian practitioners and entrepreneurs as they work to capture a market for energy here by mapping consumer demand, generating evidence that can prove the willingness of refugees to pay and securing contracts for the supply of solar powered technologies. Their efforts reveal the moral and material logics of humanitarian interventions in the field of energy, and point to the continued significance of 'crisis' for the making of Africa's energy politics, subjects and futures.

Keywords: capture, crisis, energy, humanitarianism, light, solar

Introduction: the solar refuge

'Refugees are quite interesting for us', the solar executive told me, sipping his glass of cool beer as the late afternoon sun reflected off the hotel swimming pool. 'If you think, one solar lamp per refugee and eight, ten, maybe twelve thousand people in one camp… Well, that could be huge in terms of sales. The problem is, it's not recurring. It's just a one shot sale.'

An hour earlier, Virgil had walked straight off the hotel's tennis court to meet me for an interview. He was slightly sweaty in the Ouagadougou heat. His t-shirt stuck to his chest, the words 'RECHARGE ME' emblazoned across it in bright blue letters.

'I don't know anything about solar and I never will', he announced, before slumping into a chair.

'That's ok', I told him. 'Today, I'm not interested in how your technology works. I'm interested in how you sell it.'

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Virgil was the West African business development manager for a French-owned solar company that I will call Le Sol. The solar lamp is a generic term for a small portable lighting system powered by photovoltaic modules up to 10 watts. When placed in sunlight, photons excite electrons in the module into higher states of energy, allowing them to act as charge carriers for electric current. The current is sufficient to charge an internal battery, allowing a bulb or light-emitting diode to be switched on in the dark. Le Sol produces its small, portable off-grid solar powered lamps at a factory in Burkina Faso and is one of the only companies in the world to manufacture these devices to international product standards from a manufacturing base in sub-Saharan Africa.

Six months before I met him in April 2017, Virgil had been based in Chad, working as a business development manager for Canal+, the French television channel. He had helped Canal+ to expand their West Africa market from one hundred to four thousand shops, and from one hundred thousand to three million customers. Out of the blue he had been contacted by one of Le Sol's directors, who emailed him via LinkedIn.

Le Sol was looking for a new manager to expand its markets across West Africa and increase sales. Like other solar companies, Le Sol was seeking to emulate or at least learn from the rapid growth of markets in Africa's telecoms and fast-moving consumer goods sectors by headhunting management professionals, transferring knowledge and expertise in logistics and marketing into nascent markets for consumer-focused renewable energy products.

Virgil was a perfect candidate. The multilingual child of West African parents, he had been educated in Paris and London, and held a graduate degree in Business, Creativity, Innovation and Entrepreneurship. Le Sol's directors interviewed him in Paris and hired him almost immediately.

Virgil's first few months in his new post saw him criss-cross West Africa. One week he was setting up meetings in Cameroon, the next Ivory Coast or the Central African Republic. From his hotel rooms in national capitals, he called up old contacts, asking for leads, trying to set up meetings with wholesalers and distributors as well as charities and international organizations to increase the company's regional sales figures. He added the names, telephone numbers and email addresses of contacts from meetings, trade fairs and African solar energy gatherings to the company's Excel spreadsheet of contacts. After months of travel he was exhausted and, I thought, lonely. After all, he had nothing better to do on a Saturday night in Ouagadougou than be interviewed by an anthropologist. 'It's all business', he said, and did his best to be courteous and enthusiastic. 'Ask me another question.'

Virgil had joined the company at a challenging moment. Solar lighting companies that manufactured solar lamps to international product standards were struggling against a wave of cheaper imports that did not. According to the Global Off Grid Lighting Association, a trade body, sales of these products increased fourfold over the past decade (World Bank/Dalberg 2018). Burkina Faso, like other sub-Saharan African countries, was being flooded. The trend is visible in Ouagadougou's Rood Wooko market, for example, where Burkinabe importers travel

back and forth to mainland China, importing cheaper solar lighting devices in a cornucopia of shapes, sizes and styles to sell across the country, or to export to Ghana, Togo, Ivory Coast, Benin and Mali. 'Customers like to choose', a trader here told me proudly, as I inspected the options one day.

In terms of their basic technical function – the production of light – there is little to differentiate these solar lamps from those manufactured and sold by Le Sol. As a consequence, these imported devices presented a challenge. 'The problem is that we are selling a premium product', Virgil told me. 'The main target for our solar product is that section of the population that live without electricity and have very low incomes. But it is very difficult to convince these people that our product is better than a cheap, Chinese-made solar lantern.'

When these unelectrified, low-income consumers proved themselves to be very price sensitive, Le Sol turned to other, institutional buyers. In 2017 the company sold a large consignment of solar powered lamps to a German non-governmental organization, HELP, that operated in Burkina Faso. The organization had transported the lamps to the Goudebou refugee camp, located in the north of the country a few miles from the border with Mali. Here, under an agreement with the United Nations High Commission for Refugees (UNHCR), which managed the camp, they had been distributed to displaced people as part of an emergency aid kit.

A year later, Virgil wanted to capitalize on the company's experience by approaching the United Nations directly. He imagined the company distributing small-scale solar powered lighting devices in refugee camps across Burkina Faso and Niger by securing a major procurement contract with the UNHCR. Landing a big institutional customer like a UN agency would represent a significant contract for the company, generating good publicity as much as an advance purchase order on solar lighting units. He saw this kind of partnership as a first step, creating further opportunities to provide humanitarian lighting devices to agencies responding to protracted conflict in the Democratic Republic of Congo, as well as, prospectively, future crisis created by disease epidemics or climate change.

The month before I met him, Virgil had been in Niamey, the capital of Niger. Before travelling, he checked Le Sol's database and sent a prospecting email to somebody listed as a UNHCR contact in Niger. This person put him in touch with another colleague and there were a couple more emails, until finally they set up a meeting. Virgil was careful not to divulge how far the discussion had gone but was cautiously optimistic.

'Some private companies think that the UN is quite closed or that everything is already set up', he said. 'But', he raised his glass and smiled, hinting at another realm of business in which the opportunities remained open, 'in the end people are always happy when they get to talk about their work!'

In this article, I examine the forms and modes of capture that are enacted in 'market-based approaches' to humanitarian aid across sub-Saharan Africa. As I show, the marketing and distribution of consumer energy technologies to people living in refugee camps presents a unique insight into how economies of capture are folded into economies of care.

Over the past four decades, the catalogue of solar powered or photovoltaic appliances designed 'to do good' in places with no or limited access to electricity has expanded exponentially (Cross 2018, 2019a). Alongside solar powered water pumps, one can now find solar powered desalination systems and water purification kits; solar powered medical packs, diagnostic devices and vaccine refrigerators; solar powered chargers, mobile phones and routers. Among this burgeoning solar array, it is the simple solar lamp that has gained the most attention and notoriety. Open up these solar lamps, literally and figuratively, however, and there are other critical components at work. These include ideas about the ecological and humanitarian promise of solar technology, ideas about the capacity of a solar light to empower and emancipate, ideas about electric lighting as a basic human need, and about the corporate interests that underpin green energy technologies. Tracing the connections between these components is central to an emerging anthropology of fuel and electricity, where recent debates have centred on questions of ethics (Appel 2019; Bovensiepen forthcoming 2020; High and Smith 2019; Smith and High 2017).

In an introduction to the anthropology of energy and ethics, Jessica Smith and Mette High (2017) explain that they chose the term 'energy ethics' to '*capture* the ways in which people understand and ethically evaluate energy' (p1, my italics). Their explanation neatly illustrates how the language of 'capture' is often deployed in anthropology. That is, as a shorthand account of epistemology: a description of the impulse to record or represent that underpins ethnography as empirical or interpretive work. But might the language of capture do more work? Might *capture* help us to more fully interrogate the 'ordinary' (Lambek 2010) or 'everyday' (Steinmüller 2013) ethics of energy as they unfold in attempts to build and expand consumer markets?

In this article I argue that our understanding of the ethics of energy markets and technologies have much to gain from thinking through capture as a social, cultural or political practice (Dua 2019a, 2019b). The word *capture* powerfully and provocatively describes, for example, the energy ethics of companies, policy makers and researchers working to accelerate access to solar technology in contexts of humanitarian crisis across contemporary Africa. Within this field of humanitarian action the 'moral economy of capture' (Dua 2019a) involves expressions of both care and control, efforts to reconfigure people as consumer subjects (describing and ordering their wants, needs and desires), and efforts to extend forms of market sociality (relations of credit and debt).

Capturing consumers in a crisis

Over the past decade the solar lamp has come to serve as a benchmark of whether or not people have access to the most basic level of clean, efficient energy deemed necessary for human life. Policy makers from the World Bank, the International Finance Corporation, the International Energy Agency, international governments, experts from clean energy consortia, and international NGOs have worked to revise global indices of poverty specifically around energy under the auspices of the UN's

Sustainable Energy for All Initiative (United Nations 2013). One outcome of their activity has been a global framework for tracking progress towards the UN's goal of universal access to sustainable energy by 2030. Under this framework, access to the most basic level of sustainable energy necessary for human well-being is defined as 'corresponding to the level of supply and the level of electricity services that a solar lamp can provide'. This definition has established the solar lamp as a global benchmark of whether basic needs for electricity are being met. It has also helped to make a humanitarian imperative of the distribution of solar powered lamps to people without electricity in contexts of emergency and crisis.

For at least two decades, scholars have pointed to the ways that situations of humanitarian crisis on the African continent have been reworked as 'opportunities for development'. Some have pointed to a 'normalization of crisis' (Bradbury 1998: 330), in which moments of emergency and chronic instability come to stand as temporary moments, blips in an inevitable telos of social and economic transition which augurs some future era of rehabilitation or 'development'.

Yet, as Peter Redfield (2013: 20) puts it, 'some crises are more urgent than others, and the most sudden and dramatic ones demand an emergency response'. Over the past half century, as he outlines, the horizon of humanitarian crisis has expanded. Across Africa, in the life worlds of international development and humanitarian aid, the concept of crisis has an 'elasticity', such that its meaning has moved beyond a specific biomedical understanding of emergency to encompass everything from a disease epidemic to a disenfranchised population (ibid.: 5). The idea and language of crisis, Redfield argues, is seductive for the technical expert (ibid.: 32), creating the purest of contexts in which there is a vital and immediate imperative to act.

Nowhere perhaps is this pure space of crisis more visible than in relation to the forced displacement of people. Twenty years ago, for example, the normalization of a refugee crisis might have been evident in the gradual acceptance of higher rates of vulnerability or morbidity, or a failure to engage with the underlying political and economic causes of forced displacement. Today, we might say, the normalization of a refugee crisis is also apparent in the assertion that displaced people remain economically rational or exhibit universal economic behaviours (Malkki 1995, 2005).

The temporality or normalization of humanitarian crisis is important for Africa's off-grid solar energy industry, creating different imperatives for their operations, logistics and distribution. This article tracks these shifts and developments and explores the utility of crisis talk for solar energy entrepreneurs. Over the past decade the solar powered lantern has become a remarkably stable, humanitarian technology. They are a ubiquitous part of the international emergency response to natural disasters, forced displacement and disease epidemics.

In the aftermath of Cyclone Idai in Mozambique, for example, governments, charities, corporations and faith groups sought to respond to the emergency relief effort. Organizations like the International Federation of Red Cross and Red Crescent mobilized funds to provide essential resources to those in need, including food, water, hygiene kits and solar powered lanterns. The same devices can be found in the treatment kits distributed to medical practitioners in West African Ebola

virus clinics, and in the temporary settlements erected by the UNHCR to house people fleeing across international borders from violence in Mali and the Democratic Republic of Congo.

In the immediate aftermath of disaster, the solar lamp circulates as a humanitarian gift, an object that must be given to end users rather than as a commodity to be sold to them. But as life in acute crisis is normalized, slowly segueing into life in chronic crisis, solar powered lamps circulate as humanitarian goods, objects that must be sold to end users, in ways that lay the grounds for market-based distribution of other goods and services.

Crisis talk has come to lay the ground for what development professionals call a 'market-based approach to humanitarian energy'. This rather ugly phrase is often used to signal a shift away from 'aid' and to describe projects or programmes that are focused on catalysing and expanding markets for goods and services. These programmes might range from bilateral initiatives that commit governments to preferential tariffs on portable renewable energy technologies, to support to industry associations aimed at mapping and understanding consumer preferences and spending power, to support with the marketing, sale and distribution of consumer technologies in refugee camps, and efforts to extend consumer credit or micro lending facilities to refugees.

The solar lantern first emerged as a little development device or humanitarian good in India during the early 2000s (Cross 2013, 2018, 2019b). Today's brand name market leaders prototyped their first products in rural parts of Uttar Pradesh and Odisha, before 'scaling' up their marketing and sales operations transnationally. In the 2010s, East Africa emerged as a new hot spot. Off-grid solar companies in Kenya, Tanzania and Uganda piggybacked off the networks of non-government organizations, microfinance organizations and the penetration of mobile telecommunications. Yet other regions remained marginal or peripheral markets and many off-grid solar lighting companies were keen to expand their operations in West Africa.

Small-scale, solar powered lights have more than an elective affinity or correspondence with other consumer devices like the mobile phone. In the 2010s, solar lighting companies began to build devices that could provide *both* light and power, developing low-cost electronic circuitry that used the lighting unit as a charge controller. The photovoltaic panel could charge up a battery within the unit, and an additional battery inside a peripheral device. Companies sold and marketed these devices to potential investors as technologies of enlightenment, a media of illumination, knowledge and empowerment. But they sold and marketed these devices to potential consumers as mobile phone chargers.

If the revolutionary promise of these little devices captured the imagination of investors, it was because off-grid solar companies worked hard to reference and invoke a technological sublime. In their marketing materials and advertising, solar lighting companies work hard to, as Birgit Meyer (2016 has put it, 'capture the wow'. Marketing images of people living with or using off-grid solar energy products invariably repeated the same tropes: with eyes in the darkness raised to a light,

and bodies bathed in a gentle halo. Such images connected the field of religious experience to material culture, presenting, as Meyer writes, the human body as a solid ground of existence, prone to experience spectacular 'wow' effects and a sense of wonder and amazement.

As a consumer renewable energy device, the solar powered lamp connects ecology and infrastructure, technology and landscape to credit and debt. Like other kinds of little development device or humanitarian good (Collier et al. 2018), the solar lamp has agency. Designed and built to provide a source of artificial illumination from a clean, renewable source as a replacement for kerosene, it is very difficult to 'be against'. It enlists people and organizations; connecting networks of finance to policy and producing new kinds of desiring subject.

What is unique or specific about the unfolding of these relationships in a West African refugee camp? Jatin Dua's study of piracy and protection (2019a, 2019b) upon the Indian Ocean provides a helpful comparison. Thinking about capture from a boat, as Dua puts it, 'emphasise[s] forms of social relationship that emerge specifically out of states of confinement' (2019a: 151). From the Somali coast, he proposes, the sea is a commons; and on the sea, capture creates forms of property and protection (ibid.: 46).

Like a boat on the ocean, a refugee camp can also be a space of captivity and confinement. The camp is a thoroughly 'modern institution' that operates as a 'bio-political space' (Minca 2015) for the organization, ordering and management of people and bodies, sickness and health. Geographical, physical and legal perimeters create limits on the movement of people, money and things. Understanding efforts to capture a consumer market for electronic devices in this context offers a different handle on the social relationships that might emerge out of states of confinement.

In the refugee camp, the moral economy of capture is not an attempt to break free from or disavow relationships of exchange, credit or debt (a la Sahlins 2017, cited in Dua 2019a: 43). On the contrary, in the camp the moral economy of capture further enmeshes people within relationships of market exchange, dependency and control.

How should we interpret this process? For many, perhaps, myself included, it can sometimes appear to offer an extraordinary example of predatory capitalism at a new humanitarian frontier. Yet market capture can also be the extension of forms of care.

As James Ferguson has reminded us, market exchange is not the 'negation of sociality' but the production of sociality (2015: 145). As Ferguson puts it us, markets can be social sites of distribution and coordination as well as predation (ibid.: 148). For Ferguson, reflecting on the everyday lives of southern Africa's poor, 'participation in a cash economy and participation in logics of care, dependence and obligation are in practice not contradictory "logics" but mutually enabling practices' (ibid.). I propose that we might extend this insight to the refugee camp, and to sites or spaces of humanitarian action.

Classic and contemporary studies of humanitarianism and humanitarian practice remind us that attempts to alleviate suffering for others and provide the

minimal conditions for life hinge on mechanisms for both care *and* control (Agier 2011; Pallister-Wilkins 2017). This dualism is exemplified in the refugee camp. The camp is a space of variegated sovereignty (Ong 2006, in which aspects of state authority overlap with or are ceded to international organizations. From the desks and offices of development professionals and solar industry executives, the camp presents itself as a bounded space of intervention, a closed arena that holds out the promise of total knowledge and control. In the refugee camp, displaced people or people on the move are subject to process and practices designed to make them governable.

Until recently, these processes have primarily been viewed through the lens of policing and securitization, with surveys and census practices, as well as new forms of biometric documentation, understood as processes of capture that are intended to make refugees visible and legible to camp authorities, and bring them under sovereign control (Long 2012). Today, refugee populations are drawn ever more tightly into webs of information – screened, countered, registered and enumerated. The expansion of unconditional cash transfer programmes – which sees refugees given money directly to spend on food and other goods – connects these processes directly to the expansion of markets, creating the impetus for refugees to determine how to allocate sparse resources themselves. In an era of what we might call 'post-humanitarianism' (Duffield 2019), these practices work to make refugees visible and legible to new kinds of actors, including multinational companies and entrepreneurs.

Yet capture need not only be interpreted as a form of predation – with refugees a 'captive market' for sales of goods and services. All humanitarian projects are fundamentally disciplinary, with modes of control nested within modes of care. In this sense, perhaps, market-based approaches demand to be understood as extending care for distant others precisely by seeking to envelop or encompass them within a modern, market economy.

In what follows I develop this argument by examining more closely how these relations play out in northern Burkina Faso. Goudebou refugee camp has emerged as a testing ground for international efforts to find 'market-based solutions' to off-grid lighting and power in humanitarian contexts. Over the past three years I have been following energy researchers, humanitarian practitioners and entrepreneurs as they seek to capture Goudebou's energy market by 'mapping demand', generating evidence to 'prove the willingness of refugees to pay' and securing contracts for the supply of solar powered technologies. Their efforts reveal the moral and material logics of humanitarian energy, and point to the continued significance of crisis for the making of Africa's energy politics, subjects and futures.

The road to Goudebou

Most Wednesdays in mid 2017, traders from the towns of Dori and Deou in northern Burkina Faso travelled by motorbike, bus or truck towards Goudebou refugee camp. The landscape was parched and dusty. The entrance to the camp was marked

by a cluster of metal placards with the logos of the UNHCR and non-governmental partners involved in the delivery of essential services. While the UNHCR was technically responsible for the camp's governance and management, it worked with a range of organizations to deliver their overall mandate.

Goudebou refugee camp was built in 2012 as a purpose-built settlement in the village of Goudebou, 17 km from the town of Dori, in the Sahel Region of Burkina Faso. The camp was built to accommodate an influx of people crossing the border from Mali to escape armed conflict as a result of a separatist struggle for autonomy in the country's northern province. Over the past decade, this conflict in Mali has led to the displacement of an estimated 40,743 people within Mali and led some 133,610 Malians to seek refuge in neighbouring countries (UNHCR 2017). By 2017 there were approximately 33,500 Malian refugees in Burkina Faso, mainly residing in the north of the country across two refugee camps, Goudebou and Mentao, as well as with local communities in border towns. That year, some 7,554 people were formally registered as refugees in Goudebou. This political status granted them the right to live within the camp, entitled them to access to food rations and to camp facilities. While there was no perimeter fence around the camp or clearly demarcated boundary, people registered here as refugees formally needed permission from the local government to travel outside the district.

When Goudebou camp was constructed, the UNHCR built an infrastructure for the pumping and supply of fresh water but not the generation or transmission of electricity. No buildings in the camp were connected to a mains electricity grid. Yet a line of high-voltage transmission cables and pylons was visible from the perimeter fence. These carried electricity for Burkina Faso's northern towns from sites of power generation – hydroelectric dams, coal power stations and two of West Africa's largest utility-scale solar power plants (the 22-megawatt Kona solar power station and the 33-megawatt Zagtouli power station) – in the south.

The techno-politics of electricity frequently leave displaced people or refugees in limbo. Governments and local authorities across sub-Saharan Africa are often reluctant to facilitate energy access for these populations, particularly if they fear that increased energy provision may prolong their stay or transform their legal status. Many attempts to supply energy for refugees build this impermanence or liminality into the technical infrastructure, creating mobile or temporary structures that provide basic services without confirming or cementing a right to remain. As a consequence, life in Goudebou refugee camp was not lived 'off the grid' but rather was lived 'in proximity to the grid', with the close presence of an actually existing infrastructure for electricity offering people a visible, daily reminder of their disconnection and exclusion from 'modern' energy services (see also Cross 2016, 2019b).

Once inside the camp, traders set up stalls around the designated market area and laid out their wares, from imported to locally manufactured and homemade goods. Some came with cool boxes filled with plastic bottles of Coke, Sprite and Fanta, sachets of cold water and locally made produce: bottles of milk, ginger, *bissap* (a hibiscus-based drink) and *degue* (a drink made from yoghurt and millet couscous). They also carried small electronic devices and equipment: new and

second-hand mobile phone, wires, cables and connectors. Many of these traders were native to northern Burkina Faso. For them, access to the camp often hinged on personal contacts, for example a brother-in-law who worked as a local gendarme. Some were refugees, people forcibly displaced by conflict and insecurity in Mali, who had established themselves as entrepreneurs in northern Burkina Faso's small towns.

Over the 2010s this relatively small refugee camp emerged as a testing ground for international efforts to deliver basic energy services (artificial or electric lighting and charging) to displaced people. The road from Dori to Goudebou was well travelled by teams of researchers seeking to extend an understanding of energy in contexts of forced displacement. Funded by European development donor agencies, these research teams have invariably included white, English-speaking, university-educated professionals in the field of development policy, as well as Burkinabe social scientists, engineers and consultants.

Le Sol's pilot project in Goudebou refugee camp, described in the introduction to this article, was not the only solar lighting initiative here. Between 2014 and 2016, there were multiple pilots and distribution initiatives. Solar lanterns were distributed to children attending primary school in the camp by UNICEF, the UN's children's agency, and the international charity Plan International. Some of these lamps were designed to be charged at home, had built-in thin film solar modules. Others were designed to be charged in the school, as an incentive for children to keep coming. In one project the Swedish furniture company IKEA provided solar streetlights to be installed outside the camp's school.

All of these initiatives worked in a similar way. Solar manufacturers sold units in bulk at a wholesale price to humanitarian organizations and charities, who distributed them for free. In the mid 2010s, when sub-Saharan Africa's off-grid energy sector was rapidly evolving, such bulk purchase orders from large organizations were vital. For a small solar start-up company, an advance purchase order for thousands of units could represent a massive upfront investment, allowing them to recruit staff and rent premises to scale up operations.

In early 2015, for example, a Norwegian start-up solar lighting company, Bright, secured a contract to supply the UNHCR with 200,000 units. Later that year, representatives of the UNHCR attended a trade show for the off-grid solar lighting industry in Dubai and erected a full-size refugee shelter in the middle of one of the convention centres, using this space to display products supplied by its partners, and to host meetings with potential new suppliers.

Over the past decade, however, the free distribution of solar lighting has come to represent an old or outdated model of humanitarian intervention. The future of humanitarian energy, as it has come to be articulated by development policy makers, practitioners and businesses over the past five years, has come to centre on the sale of solar powered devices direct to displaced people themselves. Like the rationale for selling rather than giving away malaria nets in sub-Saharan Africa (Chandler and Beisel 2017), the rationale for selling solar to refugees is that only by paying for a product will people truly value it. Handing out solar lamps for free, market

advocates argue, keeps people dependent on hand-outs and aid. But paying for solar light, they argue, creates demand, ands makes people more interested or more likely to invest in another solar powered lighting device at some point in the future.

Off-grid solar lighting companies that give their lamps away have found themselves assailed by companies that are trying to sell them for 'distorting the market'. The chief executive of one solar manufacturer operating in West Africa described the tensions, in a 2018 interview from his European headquarters.

> We thought we were doing the right thing by giving things away. We didn't bother to look too much into what other companies were doing. We didn't think we would have an effect on them. Given the amount of people who needed light, we figured that distributing 12,000 units wouldn't hurt anybody else. But it did. One of these companies complained. They said, 'What on earth are you doing? Everybody is going to think solar is for free now'. So we pivoted our approach.

This pivot involved a reframing of crisis in two ways. On one hand it involved a subtle de-intensification of crisis. This allowed solar manufacturers to emphasize how, over time, refugee communities may have opportunities for income generation and livelihoods. On the other hand it involved a subtle extension of crisis. This allowed solar manufacturers to confer new legitimacy on their products and actions by reminding people that electric lighting remained an unmet humanitarian need, the absence of which demanded an urgent, immediate response.

These shifts played out in Goudebou. This relatively obscure temporary settlement on the edge of Sahel, far from Burkina's capital, became a test ground in which European governments and other international development actors trialled a market-based approach to humanitarian energy. Their experiments made Goudebou a 'truth spot' for the off-grid solar industry (Gieryn 2018), a place that can stand in for other 'last mile' or 'hard to reach' energy markets and from which new knowledge can move. Located at a significant commercial juncture between anglophone and francophone West Africa, it also provided a soft-landing spot from which companies sought to enter other west African markets.

Energy on the move

There is nothing new about attempts to deploy renewable energy technologies in refugee camps. Some of the earliest attempts in East Africa to use solar photovoltaic technology for large rural populations, for example, date back to 1982 when it was used to pump water in refugee camps in Ethiopia and Somalia. These efforts were virtually all government or donor led. Today, by contrast, approaches to humanitarian energy overwhelmingly see partnerships with the private sector and the expansion of markets as the most efficient, cost-effective solution to delivering energy services in refugee camps.

In 2015 a new consortium of UN agencies, European governments and international NGOs launched a new initiative that aimed to catalyse new interventions and engagement on energy for displaced people. The consortium included the UN

High Commission on Refugees, the governments of the UK and Norway, alongside international non-governmental organizations Chatham House, Practical Action and the Global Village Energy Partnership. Dubbed the 'Moving Energy Initiative', this programme had a budget of £10 million over five years and was billed as a pioneering example of a new kind of humanitarian response to forced displacement, one in which partnerships with the private sector play a crucial role. Over the five-year period the partners were tasked with making sustainable energy provision a key part of responses to forced displacement and humanitarian emergency, while piloting new approaches and models for sustainable energy provision among displaced populations, building the case for deepening partnerships with the private sector and developing recommendations for systemic change across humanitarian, development and human rights organizations.

Between 2016 and 2018 I collaborated with the Moving Energy Initiative as part of a UK government-funded academic research project on global challenges. Under the terms of the funding, I worked with the Moving Energy Initiative's partner organization in Burkina Faso to produce an ethnographic study of people's everyday lives with energy technologies and infrastructures in Goudebou (Cross et al. 2019). Our partner hired two Burkinabe researchers and a translator to conduct research in Goudebou camp. Over the course of eighteen months, I worked with colleagues at the University of Edinburgh to guide their questions and methods, analyse their fieldwork notes and produce a number of reports.

As an anthropologist, my contribution to this project sought to demonstrate the depth and breadth of non-market or informal exchange relationships through which people living in Goudebou accessed energy goods and services, as well as the extent of people's working knowledge of materials, tools, technologies and energy systems. Yet these insights – which built explicitly on the anthropology of economy, material culture and energy – often seemed to be downplayed or worked out of reports and publications. Why, I wondered, if they were such a vital feature of the camp's economy was more attention not paid to them? I began to explore this question in interviews with the Moving Energy Initiative's consultants, researchers, policy makers and development professionals as well as with corporate executives involved in the humanitarian energy sector in Burkina Faso, Kenya and the UK.

The Moving Energy Initiative was a model project. It was not just or only about creating the conditions, opportunities and infrastructure for the private sector to provide energy in refugee camps; it was conceived as a potential exemplar for all private sector investments in refugee camps. As one of the freelance consultants involved in the early implementation of the project explained to me, from conception the intention had been to scale up its approach. To do so, they explained, 'You need models that address the fears and anxieties of all the stakeholders involved … You need ways of doing things that become normal practice and then become standardized'.

Realizing this goal, as I came to understand it, required economic activity in the refugee camp to be captured and rendered in a particular way, intelligible and translatable to people in other contexts, across geographical and disciplinary domains.

It required a kind of universal or universalizing language, like those orthodox, neoclassic terms used to describe the economy and economic behaviour.

Making up markets

The Moving Energy Initiative began work in 2015 and one of the partners – the UK's Royal Society for International Affairs (also known as Chatham House) – received a £200,000 budget to conduct scoping studies that included Goudebou camp. The reports they produced created a particularly narrow portrait of economic life in the camp.

The general assessment was, as one report put it, that 'there are no formal businesses in the camp that have the explicit purpose of providing energy services to camp residents' (Vianello 2016, p4). Although the author conceded that there was 'anecdotal evidence' to suggest that 'camp households do participate in informal energy-related economic activities', this was not considered a significant focus.

This kind of portrait fits directly into dominant scholarly approaches to the study of 'refugee economies', which use the term economy as shorthand for market exchange. As a major reference work on the subject lays out (Betts et al. 2017: 47), 'our starting point is the most basic neoclassical understanding of economics [in which] markets represent ways in which buyers and sellers meet and trade for a given good or service for a particular price or quantity'. While such approaches are prepared to engage with what they call imperfections or failures in these markets, they rarely step outside of this frame to consider economic activity in a fuller, broader sense. For many anthropologists and heterodox economic theorists, this writing has limits. It excludes a diverse range of economic activities and practices – from forms of gift giving and sharing to forms of hunting, gathering, gleaning, sacrifice, theft, piracy and poaching (Gibson-Graham 2014) – rendering these unimportant and leaving them unexamined.

In 2016, another of the Moving Energy Initiative partners – the UK NGO Practical Action – was allocated funds to complete a quantitative 'baseline survey of energy needs' in Goudebou. This baseline survey would involve a small team of engineers and energy researchers who travelled backwards and forwards between Ouagadougou and Goudebou over a nine-month period. Their research activities were designed to map and order the camp's economy in order to produce a plan for future interventions.

The survey included a full audit of people's 'current energy use', an inventory of their current technologies, an assessment of their 'needs and priorities', geospatial information and an evaluation of their 'willingness to pay for energy'. These questions were mapped onto 'tiers of energy access', beginning with a single basic solar light, and gradually moving up through more extensive appliances (televisions, radios, fridges). These data were compiled in an Excel spreadsheet, and the researchers developed a modelling system that converted their data into a calculation of energy 'demand' for different kinds of lighting, cooking and charging products. One of the coordinators described the process for me.

> We had a detailed way of gathering data, all based on what users say they already have and what tier of energy access they would like to get to. Then we create a model, that comes out with the costs for household users, their willingness to pay and what they will pay for … This is not really a final answer, because there are lots of different answers. But the model can give you numbers. Like this percentage of people will pay for solar and it will reach this number of people.

The data collection exercise captured the energy landscape in particular ways. The economic survey was limited almost entirely to formal or registered enterprises and was unable to account for the forms of barter and gift exchange between camp inhabitants that formed a vital part of people's everyday provisioning. Reading back the data sets, the researchers acknowledged there were gaps or faults in the data, but they understood this in a technical sense. If a respondent had not answered the question, this was counted as a negative reply, or (if their answers were given on a scale) this was put at the bottom of the scale. The interviews with key informants were ad hoc and patchy, and difficult to verify. And they recognized there was a lack of attention to relationships. As one of the research analysts put it, 'We understand the basic data, but we don't understand how people interact'.

As they processed these data sets into results, they employed a consultant and an experienced policy researcher. The initial findings were written up into a series of presentations and reports. One of those involved in commissioning the report explained to me, 'The aim is to show … these are the figures, this is how it looks like when you quantify it, and these are the mechanisms that will allow you to actually deliver energy to people'.

Underpinning this exercise was the assumption that people's current expenditure on fuel could act as a proxy for prospective or future spending on consumer energy technologies. As one consultant put it, 'People buy charcoal, LPG, batteries and wood. The question is, does that mean that they are going to pay for lighting, charging or cooking technology?'

The answer, presented in a final report (Corbyn and Vianello 2018), was that a significant number of displaced people living in Goudebou refugee camp were 'willing to pay' for cleaner and more efficient energy technologies but lacked the financial resources to actually do so. The authors used the baseline data to put numbers to this claim. In Goudebou, they reported, the market research data suggested 'a potential customer base of 2,000 families and a market worth up to $270,000 per year' (ibid.: 6). The development of this market for consumer energy products, they argued, remained contingent on 'sustained financial support from donor agencies'.

Such conclusions were not uncontested. Burkina Faso's UNHCR employees were sometimes sceptical about the growing interest in market-based approaches to the provision of energy. In Ouagadougou, UNHCR representatives struggled to understand the market logic or rationale for encouraging business activity in the country's refugee camps. Some viewed it as a kind of profiteering. As one UNHCR representative with responsibility for Goudebou put it bluntly, 'The UNHCR is interesting for the private sector not because they like us but because they want to make money'.

While some humanitarian practitioners were working to make Goudebou's refugees visible and legible as consumers, UNHCR staff refused to see the camp's inhabitants in these terms. For some, the very notion that a refugee might also be the target of market research or consumer marketing was deeply distasteful.

'If you were a company trying to sell things', one senior UNHCR official asked me, rhetorically, 'would you go to a refugee camp? It would be like talking to a man who is hungry and saying, "My watch is so nice!"'

The potential size and scale of the market for energy commodities in Goudebou seems, at first, incommensurate with the scale of investment in this one camp alone. Over the past five years, attempts to capture the market for consumer energy technologies have seen repeated market research activities. In 2018, an international consultancy group, Initiatives Conseil International, was commissioned by the Moving Energy Initiative to provide updated market research insights from the camp. They ran two 'market study focus groups' with groups of twelve women, each lasting between two and three hours over several days. The focus group involved product demonstrations by a sales or marketing agent, with researchers observing the perceptions, observations and reactions of participants, and inviting people to describe how much they would pay for specific products.

In one activity, the researchers asked how much they would pay for specific products. 'For some products', they reported, 'the willingness to pay was close to the real cost of the product' (Moving Energy Initiative 2019a). But willingness was different, they concluded, from ability, and they proposed that the 'potential market' for energy technologies might be increased by boosting 'the purchasing power of the target audience', increasing access to 'basic financial help' and offering new forms of consumer credit via partnerships with microfinance organizations (Moving Energy Initiative 2019b).

Over time, these activities have slowly moved beyond the jurisdiction of the camp itself. In January 2019, the Moving Energy Initiative hosted a trade fair in the town of Dori. If tacit knowledge of consumer markets had once brought Burkinabe traders up the road to the camp, the search for extended market insights was now taking humanitarian market researchers from the camp to the town.

Off-grid energy companies helped to fund the event and set up stalls in the town to distribute marketing materials and sell products, and staff were available to talk to prospective customers. The event was designed in collaboration with an international consultancy firm, EcoVentures International, and the town's municipal authorities. A local radio station advertised the fair in three languages and an advert was placed in a local newspaper. One of the explicit aims of the event, as the organizers put it in a written case study, was to '*capture* market research' (Moving Energy Initiative 2019c; my italics). In practice, this meant that the municipality had to capture attendance at the event, and participating companies had to capture their sales figures in order to report back.

In this way, the Moving Energy Initiative reduced energy poverty to an index of material possessions rather than practices. Their studies produced an exhaustive inventory of the types of fuel and technology being used in refugee camps,

but virtually no detail about how these are used in people's everyday lives. They reported what people said they wanted rather than what people actually did. They revealed the numbers of particular technologies – cooking pots, water carriers, solar panels and battery-powered torches – but provided virtually no information about why these things were so highly valued, or how people adapted them for use in these settings. Against this backdrop, there was little attempt to examine how people actually used, perceived and experienced energy technologies. Even by the standards of market research studies, let alone the anthropology of material culture and mass consumption, such an attempt to capture the depth of people's desires, aspirations and relationships to material things and behaviour was decidedly thin description. Even the researchers themselves were not entirely convinced by the exercise. As one consultant on the Moving Energy Initiative put it to me, 'The only way forward … the only way we can find out what these people want, is when people can buy what they want'.

So, what did such market research actually capture?

The technical documents and research reports produced by the Moving Energy Initiative and its partners did not *describe* an economy, they *enacted* an economy (Callon et al. 2007; MacKenzie et al. 2007 Riles 2006). The modelling of prices, preferences and priorities was – in Donald MacKenzie's (2008) classic phrase – more an engine than a camera. Rather than recording or reproducing the empirical reality of economic life in a refugee camp from some external vantage point, these models were embroiled in its economic life. Rather than capture the economy of the refugee camp in some holistic sense, they captured *the* camp in a particularly narrow sense, as a potential market for consumer products. These efforts reformatted the person of the refugee as a potential consumer for off-grid products and granted legitimacy to the work of selling to them. In these terms, they were successful.

Conclusion: capture, consumption, care

At the beginning of 2020, amidst escalating attacks by armed militia groups in northern Burkina Faso, the entire population of Goudabou left the camp, seeking refuge elsewhere. The pilot projects to create a market here may have failed but the broader project – to fully incorporate refugees as potential consumers into solar markets across sub-Saharan Africa – had succeeded. Elsewhere, in Uganda and Rwanda, Kenya and Tanzania, the continent's largest European and North American off-grid solar energy companies had begun to incorporate refugees into their sales strategies, marketing off-grid energy products directly to people living in a camp in exactly the same way as they did to people living outside them. At a solar industry trade event held in Nairobi that year, I listened to a representative of the World Bank's International Finance Corporation invite corporate managers to keep focused on the opportunities. 'We have 26 per cent of the world's refugees living in sub-Saharan Africa', he told the audience. 'You don't have that many untapped market segments of 200 million people!'

The broader significance of such comments and this paper extends beyond the anthropology of energy, to invite a reconsideration of critical approaches to humanitarianism in recent anthropological thought. For some scholars the shifts in the delivery of energy technologies and services to displaced people described might demand to be understood in terms of ideological commitments to growth and entrepreneurship; perhaps even as a 'covert triumph of neoliberal and technocratic logics' under the guise of humanitarianism (Biehl and Ong 2018). Recent critiques of 'techno-saviorism' (Abdelnour 2015) and the 'fetishism' of humanitarian technologies (Scott-Smith 2013) provide an essential vocabulary for this line of analysis. Working through the metaphor of capture we could extend this further, allowing us to understand how a simple solar lamp materializes a complex body of technical, environmental and sociological knowledge to 'ensnare' (Corsin Jimenez and Nahum-Claudel 2019) the aspirations, desires and needs of displaced Africans within a global consumer economy; indeed, within capitalism. In this sense consumer technology itself is a fundamental part of the 'trap': the sale of a solar powered lamp captures information about people as consumers at the same time as the image of its use captures new flows of public money for the manufacture and distribution of private goods.

The sale of consumer technologies in contexts of humanitarian crisis and chronic poverty can certainly appear – and be experienced – as predatory. But, as Peter Redfield has argued, in our critical examination of these micro-level technologies and market interventions we should also avoid fetishising the alternative; by imagining, for example, that macro-scale, or state led interventions to improve the human condition may be substantial better (Redfield 2017). In this spirit, closer examination of the moral economy of capture reveals the entanglement of economic logics with logics of care (Fassin 2011) and the pursuit of ethical personhood (Robbins 2013).

Modern logics of capital and care are not opposed. On the contrary, as the economic historian of humanitarianism Thomas Haskell (1985a, 1985b) argued, the expansion of market discipline in Europe between the seventeenth and eighteenth centuries brought shifts in 'conventions of moral responsibility' – a 'new constellation of attitudes and activities' – that underpin what is called humanitarianism today (1985a, p342). At the heart of these shifts, Haskell argued, was the gradual elaboration of techniques for conducting business that established new ways of connecting individual actions to consequences over time and space. Haskell's argument resonates powerfully today. In the Moving Energy Initiative, and the transformation of refugee camps into markets for consumer goods, we see the continued evolution of these techniques, and their formalisation as a historically specific, mode of intervention in the world. Within the entrepreneurial, bureaucratic and technocratic communities created around efforts to accelerate energy access in Sub Saharan Africa, the making of markets is a fundamentally moral project; one that allows individuals to connect their everyday work and actions to improvements in the lives of unrelated strangers.

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